

## Special Report Looks at Radiology's Role in Combatting Climate Change

Released: April 18, 2023

At A Glance

- The global health care system accounts for 5 to 8.5% of total greenhouse gas emissions in developed nations.
- Medical imaging is estimated to account for 1% of global greenhouse gas emissions.
- Radiology's role in the health care system presents an opportunity to lead low-carbon, sustainable initiatives in workplaces and communities.

OAK BROOK, Ill. (April 18, 2023) — The health care system is a substantial contributor to greenhouse gas emissions, and radiology's role in the health care system presents an opportunity to lead low-carbon, sustainable initiatives in workplaces and communities, according to a special report published in [Radiology](#), a journal of the Radiological Society of North America (RSNA).

[download photo](#)



Kate Hanneman, M.D., M.P.H.

The special report addresses the importance of climate change to radiologists and the medical imaging community, including the impact on human health and health equity, the contribution of health care and medical imaging to the climate crisis, and the impetus to build a more sustainable future.

“The focus is on actions and opportunities to address climate change in our role as radiologists and to link our actions with their impact and expected outcome,” said the report’s senior author Kate Hanneman, M.D., M.P.H., associate professor in the Department of Medical Imaging at the University of Toronto and sustainability lead at University Medical Imaging Toronto in Toronto, Canada. “Because radiologists are adept at managing rapid technological change, we are ideally positioned to lead these initiatives within our departments, health care systems and communities.”

Climate change occurs due to increasing carbon dioxide (CO<sub>2</sub>) and other greenhouse gases in Earth’s upper atmosphere. Due to its large size and its intensive use of resources, the global health care system emits more than 2 gigatons of CO<sub>2</sub> equivalent annually and accounts for 5 to 8.5% of total greenhouse gas emissions in developed nations.

While the majority of greenhouse gases emitted by the health care sector come from manufacturing, transporting, using and disposing of purchased goods, the sources of emissions from individual specialties differ. For diagnostic radiology, most emissions come from the production of medical imaging equipment and the energy needed to power it. Overall, medical imaging is estimated to account for 1% of global greenhouse gas emissions.

Although the dangers of climate change have been known for decades, health care has been slow to address its substantial carbon footprint. However, there is a growing movement to align health care’s environmental practices with its core mission to minimize harm and protect public health.

“The harmful health effects of climate change disproportionately impact those already vulnerable due to social, environmental, and public health factors,” Dr. Hanneman said. “Groups most likely to be harmed are those already experiencing health inequities due to age, race, culture, sex/gender, socioeconomic status, geographic location and chronic illness.”

As the focus on sustainability increases, radiologists are well positioned to play a leading role in pushing for greener health care. As experts in technology, radiologists can innovate more sustainable methods of care, such as finding new applications for telemedicine and telecommuting, reducing energy-intensive imaging sequences that do not add clinical value, and scheduling patients more efficiently to minimize idle time for equipment. As key players in the purchasing process, radiologists can prioritize the energy efficiency of equipment in their purchasing decisions and work with vendors to improve the sustainability of their products.

The report outlines a framework for environmentally sustainable health systems that can be applied in radiology departments. First, reduce demand for health care services by supporting policies and programs that promote public health, including screening. Second, match the supply of health services to the demand; for example, by ensuring the appropriate use of imaging. Finally, reduce emissions from the provision of necessary care.

The authors also offer several toolkits highlighting actions institutions, organizations and individuals can take to address climate change.

“On the current trajectory of greenhouse gas emissions, climate change will become the defining narrative of human health,” Dr. Hanneman said. “Mitigating emissions offers the opportunity for a future in which local and global populations not only survive but thrive.”

“Climate Change and Radiology: Impetus for Change and a Toolkit for Action.” Collaborating with Dr. Hanneman were Maura Brown, M.D., Julia Hyde Schoen, M.D., M.S., Jonathan Gross, M.D., and Reed A. Omary, M.D., M.S.

In 2023, *Radiology* is celebrating its 100th anniversary with 12 [centennial issues](#), highlighting *Radiology*’s legacy of publishing exceptional and practical science to improve patient care.

---

Video (MP4):

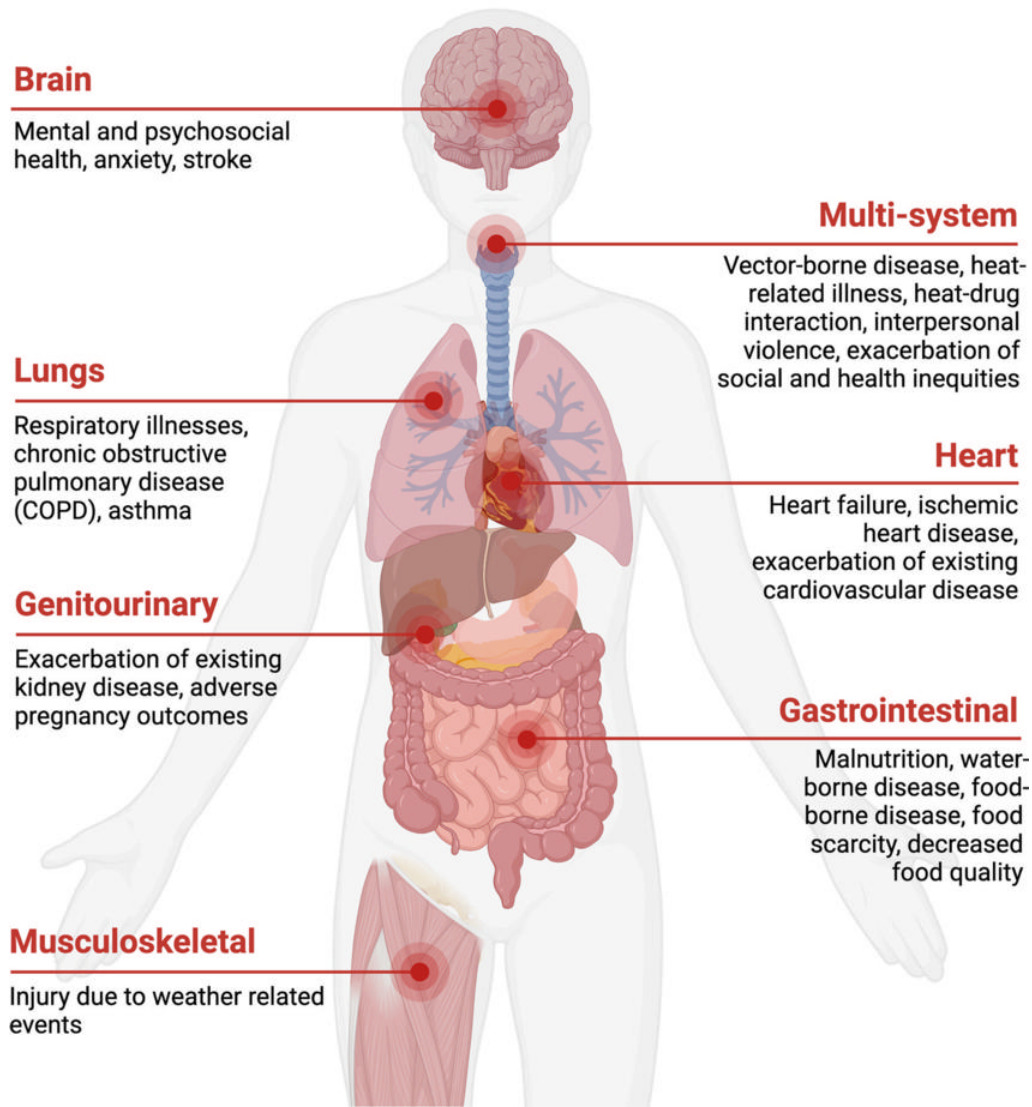


**Video 1.** Climate Change and Radiology

[Download](#)

Images (JPG, TIF):

## Health Effects of Climate Change













**Figure 1.** Illustration shows the health effects of climate change grouped according to organ system. Created with BioRender.com. [High-res \(TIF\) version](#)

## Why Should Radiologists Care About Climate Change?

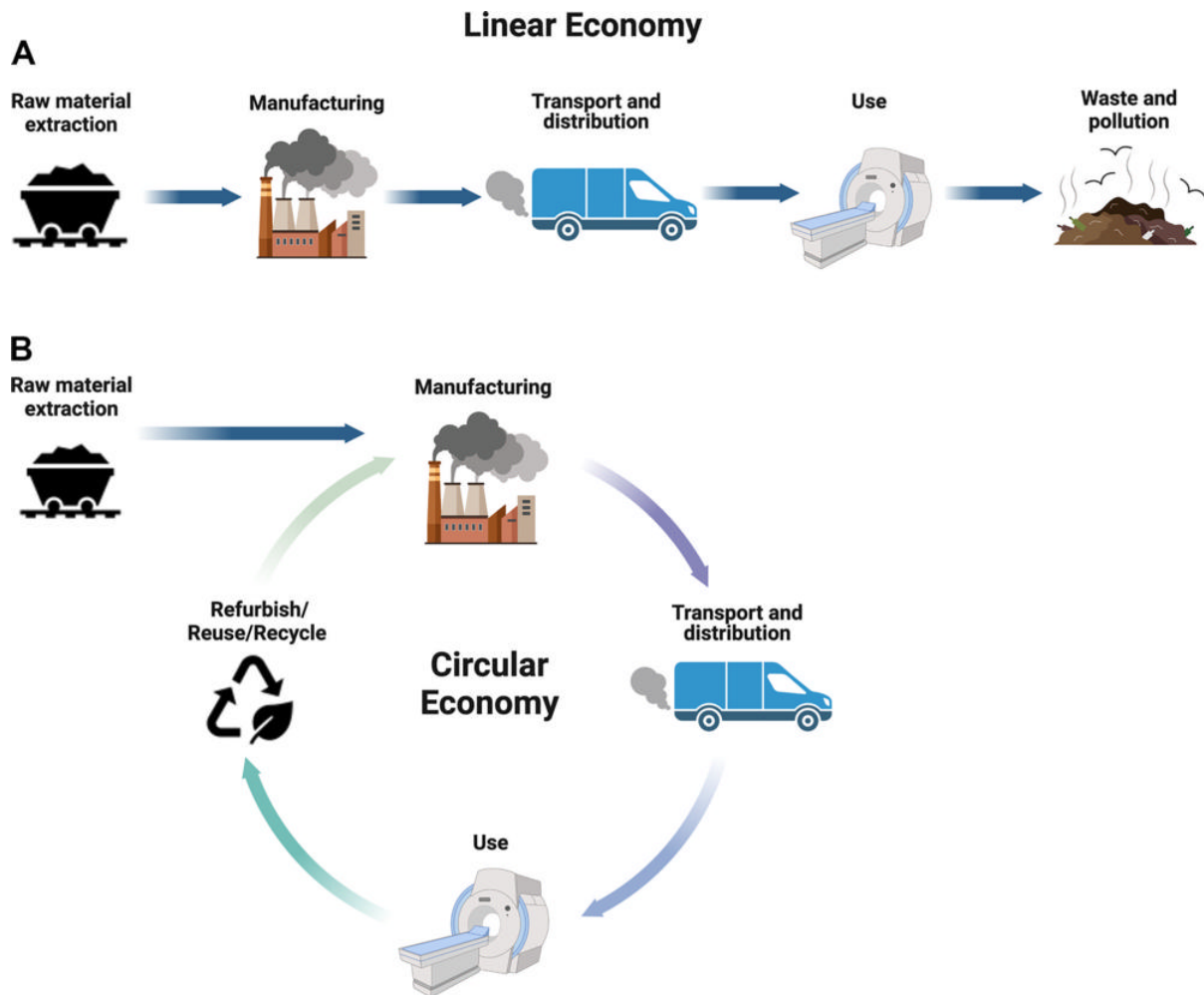
Reason	
Near-term impact and health equity	Climate change negatively impacts human health now
	Vulnerable populations are disproportionately affected
	Extreme weather events disrupt the health system's ability to deliver care
Impact of health care and radiology	The health care sector is responsible for a large amount of GHG emissions
	Radiology is a major contributor due to high energy consumption and waste
	Patients expect health care systems to operate more sustainably
Potential for change	We can protect public health and those most vulnerable to climate change
	Actions we can take now have the potential for substantial energy savings
	Radiologists are ideally positioned to lead change for sustainable healthcare

**Figure 2.** Chart shows key reasons radiologists should care about climate change. GHG = greenhouse gas. Created with BioRender.com. [High-res \(TIF\) version](#)

## Top 10 Actions to Address Climate Change

	Action	Impact
Daily Lives	① <b>Increase plant-forward meals and reduce waste</b> 	20-30% reduction of GHG emissions by halving meat consumption
	② <b>Use alternative modes of transportation</b> 	67% decrease in GHG emissions from transport by shifting one car trip to one bike trip per day
	③ <b>Shift toward building electrification</b> 	38-53% reduction in CO2 emissions for a residential heat pump over a gas furnace
Radiology Departments	④ <b>Turn off electronics and CT scanners overnight</b> 	40-80% energy saving by powering down CT scanners during non-operations time
	⑤ <b>Limit single-use disposable medical supplies</b> 	41% of total GHG emissions in interventional radiology suites
	⑥ <b>Reduce low-value imaging</b> 	\$433 million cost savings yearly with appropriate use guidelines
	⑦ <b>Reduce waste of contrast and single-use plastic</b> 	93% reduction in plastic waste by switching to multi-dose contrast system
Industry and Vendors	⑧ <b>Implement sustainable procurement policies</b> 	50-80% potential energy savings
	⑨ <b>Improve energy consumption in idle and system-off states</b> 	30-67% energy consumption for CT and MRI in non-productive modes
	⑩ <b>Decrease packaging of medical supplies</b> 	Less waste and lower energy and cost from transportation

**Figure 3.** Chart shows the top 10 actions for radiologists to address climate change. GHG = greenhouse gas. Created with BioRender.com. [High-res \(TIF\) version](#)



**Figure 4.** Product life cycle assessment. In a linear economy (A), natural resources are extracted, consumed, and eventually disposed of as waste. This is inefficient compared with a circular economy (B), in which a product is designed to reduce waste and maximize material value over its life span through reuse and recycling. Created with BioRender.com.  
[High-res \(TIF\) version](#)

Resources:

[Study abstract](#)